

In the Drawings:

Two replacement sheets of drawings (sheet 1 and 4) are herewith submitted depicting amended Figures 1 and 4.

In the Claims:

A listing of claims starts on page 3.

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REMARKS

Drawings:

The drawings were objected to because blocks 106 and 114 in Fig. 1 and block 406 in Fig. 4 lacked a descriptive label.

The replacement sheets now contain labeling for the items, i.e. "Solenoid Valve" for blocks 106 and 406, and "Ammeter" for block 114 (see description [0025] last line, [0033] line 5, and [0039] line 3).

Specification:

The disclosure was objected to because of on page 8, it stated that the absolute magnitude of the current was not important and that only whether the detected current was rising or falling was necessary (lines 1-4). Subsequently, it stated that the program 420 checked whether the current had risen in comparison with the preceding current (lines 30-32). If the detected current were known only as rising or falling, then the program 420 would be unable to compare whether the current has risen from previous measurements.

The current measurement is only needed for immediate comparison with subsequent current values. Thus, it is of no relevance whether the current measurement is correctly calibrated as long as possible scaling errors and offsets are consistent throughout all measurements. For further processing, the "important" parameter is the direction of change, not the amount of change or the absolute measurement, of the current values to determine a local maximum, i.e. a vertex in the curve of current over time.

Claim Objections:

Claims 20 and 30 were objected to because of the limitation of *peak current*. It was noted that the peak current could be a maximum current applied to the solenoid and not necessarily the point at which movement occurs, in which case would inconsistent with the specification.

This objection is somewhat confusing as the term "peak current" does not occur anywhere. Also, it is clearly stated that a voltage is applied (not a current) and the peak point of the current is determined "on account of the voltage," i.e. that the current is not the controlled quantity, but the voltage is. The current flows due to the voltage applied. As the voltage is increased, the current reaches a maximum when the magnetic force generated by the current equals the sum of spring force and pressure force. Subsequently, even if

the voltage rises further, the current will temporarily decrease as long as the valve armature is moving. The claims have been amended to add the clarification that the peak point represents a switching current at which the valve switches to an open position. If this is not what the examiner suggested, clarification is requested.

Claims 26 and 27 were objected to because of the words "*one of the preceding*."

These words had inadvertently been left in the claims from their original version and have now been removed.

Claim Rejections – 35 USC § 101

Claims 20-29 were rejected under 35 U.S.C. 101 because the claimed invention was directed to non-statutory subject matter, i.e. the outcome of *determining the pressure* step had not been used in a disclosed practical application nor made available in such a manner that its usefulness in a disclosed practical application could be realized.

Claim 20 has been amended to include the step of generating output information representative of the pressure. This limitation is evident from Figures 1 and 4 (see arrow labeled "pressure"). Claims 21–29 depend on claim 20. It is thus believed that the rejection is overcome by the added limitation.

Claim Rejections – 35 USC § 102

Claims 30 and 31 were rejected under 35 U.S.C. 102(b) as being anticipated by Broome (5,277,485).

Broome controls the coil *current*, not the voltage. Broome suggests to actively lower the spool current after the valve has been opened (see column 7, lines 59-67). Broome's peak point is not the observed result of the valve armature moving but is actively generated by a control unit lowering the current after the valve has opened. Broome's peak point does not correspond to the peak point of the present invention, in which the voltage is controlled and the current is observed.

Measuring the actively controlled current does not give any information on a prevailing pressure, only on predetermined settings within the control unit. Accordingly, Broome is incapable of determining the pressure on the basis of the peak point.

Thus claim 30 and 31 are not anticipated by Broome and believed to be patentable.

Claim Rejections – 35 USC § 103

Claims 20, 21, 23 and 29 were rejected under 35 U.S.C. 103(a) as being unpatentable over Broome in view of Kurokawa et al. (5,496,101) and Archer et al. (5,825,216).

Broome controls the coil current, not the voltage. Broome suggests to actively lower the spool current after the valve has been opened (see column 7, lines 59-67). Broome's peak point is not the observed result of the valve armature moving but is actively lowered by a control unit. Thus measuring the actively controlled current does not give any information on a prevailing pressure.

Archer uses a normally open valve unlike the present invention, which uses a normally closed valve. Any observed peak in current when actuating the valve according to Archer is solely representative of the spring force, not of the pressure, since the pressure on both sides of the open valve is the same. Thus even a determination of the peak point of the current as disclosed in Archer is useless for achieving the objective of the present invention, i.e. pressure measurement.

Kurokawa, who just like Broome controls the solenoid current and not the voltage, even assumes a linear correlation between current and force, as correctly stated by the examiner.

Combining the teachings of Broome, Archer, and Kurokawa will not give a motivation or suggestion toward the present invention, for all of the references teach away from the claimed subject matter.

Only one of the references, i.e. Archer, suggests measuring the current as a response to an applied voltage. Archer, however, works with a normally open valve whose coil current is not indicative of the prevailing pressure.

The other two, i.e. Broome and Kurokawa teach *controlling* the coil current. Thus, the only teaching referring to the relationship between pressure and current is Kurikawa's, who teaches that, the higher the pressure is, the higher the applied current needs to be. None of the references discloses that, if applying a controlled voltage, (a) there will be an automatically occurring peak point in the observed (*not controlled*) current for a *normally closed* valve and (b) that a peak point occurring in the observed coil current represents a prevailing pressure.

It is therefore believed that claim 20 and all claims dependent on claim 20, including

claims 21, 23 and 29, are patentable over Broome, Archer, and Kurokawa.

Accordingly, Applicant believes that all pending claims as presented in this amendment are patentable and that the application is in proper shape for allowance.

Respectfully submitted,



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